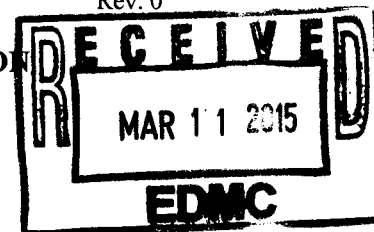


## AIR MONITORING PLAN FOR THE REMEDIATION OF UNPLANNED RELEASE SITE UPR-600-22



### 1.0 INTRODUCTION

The remediation of the UPR-600-22 waste site has the potential to emit radionuclides. This activity is being conducted under a 2013 *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) Record of Decision (ROD) (EPA 2013) in accordance with DOE/RL-2001-47, *Remedial Design Report/Remedial Action Work Plan for the 300 Area*. Implementation of best available radionuclide control technology (BARCT) and air monitoring have been identified as substantive requirements (i.e., applicable or relevant and appropriate requirements) for this remedial action. These substantive requirements are according to *Washington Administrative Code* (WAC) 246-247-040. This plan presents compliance with those requirements.

The site consists of a series of small parallel berms, which are approximately 0.6 m (2 ft) high, 0.9 m (3 ft) wide, and 9 m (100 yd) long. The berms are arranged to form a triangle-like-shaped site of approximately 1.2 ha (3 acres). The site is directly adjacent to the 618-11 Burial Ground, to its north. The area was contaminated in 1967 with particulate fallout from burial activities at the 618-11 Burial Ground. The contamination was covered by scraping the affected area into "windrows" (berms). In 1972, a backhoe was used to cut across each berm at a distance of every 15 m (50 ft) to a depth 15 cm (6 in.) below the normal ground level. Radiological surveys were made of all the soil removed from the berms and of the walls of each cut made by the backhoe. No beta, gamma, or alpha contamination was detected above background levels (100 counts per minute).

In 2012, a verification sampling campaign was undertaken with the goal to obtain sample information to support closeout of this site (0600X-WI-G0069, *Work Instruction for Verification Sampling of the UPR-600-22, WPPSS Windrow Site*). Unfortunately, two locations exceeded the cleanup levels as stated in the ROD. The areas represented by these failed samples are the only areas needing to be remediated, since all other sample results were below cleanup levels. Remediation of each of the two areas will consist of removal of soil from an approximately 3-m (10-ft)-wide by 3-m (10-ft)-long by 7.6-m (3-ft)-deep excavation (approximately 17 m<sup>3</sup> [600 ft<sup>3</sup>] total). Following the removal of the soil, fixative will be immediately applied to ensure soil does not migrate from the site and the areas will be resampled and the data added to the previously collected verification data to support closeout of the site. The windrows will be flattened and the site contoured to match the surrounding terrain. After this, the site will be surveyed using a Global Positioning Environmental Radiological Surveyor (GPERS) to ensure that no surface contamination exists after the contouring activities.

### 1.1 PLANNED ACTIVITIES

General remedial action operations for the UPR-600-22 waste site include excavating, sampling, and transport of waste soil. Excavated material will be sent to the Environmental Restoration Disposal Facility (ERDF) for disposal.

## Soil Excavation

Standard construction equipment will be used for excavation, loading, and hauling. Haul trucks with loaded containers will enter a survey area where they will be screened to detect exterior contamination. A decontamination station will be established to decontaminate containers and haul trucks, as required. Waste containers and/or haul trucks will be decontaminated by conventional means such as brushing or wiping. Decontaminated trucks and containers will then proceed to the container transfer area where the containers will be picked up for transport to the ERDF.

## 2.0 AIRBORNE SOURCE INFORMATION

There is a very low potential to emit radionuclides during the remediation of the UPR-600-22 waste site. The soil was contaminated in 1967 during a disposal activity at the adjacent 618-11 Burial Ground. In 2012 a verification sampling campaign resulted in two areas failing cleanup standards. One sampling area (FS-1) failed for plutonium-238 at 188 pCi/g, cesium-137 at 46.5 pCi/g, and strontium-90 at 27.2 pCi/g. Another sampling area (UPR-11) failed for strontium-90 at 7.14 pCi/g. See Figure 1 for sampling areas and Table 1 for sample data.

The CAP88-PC model was used to determine the total effective dose equivalent, or annual unabated offsite dose, for this activity. The potential to emit (curies per year) was the input for the computer model, and the model generated that annual unabated dose. The CAP88-PC model summary and synopsis are presented in calculation 0600X-CA-V0186, *Total Effective Dose Equivalent Calculation for the UPR-600-22 Unplanned Release Waste Site*. The total effective dose equivalent to the hypothetical maximally exposed offsite individual (MEI) for this activity is 4.03E-01. The MEI for this activity is located at the Chelan Building at Energy Northwest's Columbia Generating Station, which is located 202 m (663 ft) to the southeast.

## 3.0 BEST AVAILABLE RADIONUCLIDE CONTROL TECHNOLOGY (BARCT)

Only a small amount of contaminated soil (to approximately 17 m<sup>3</sup> [600 ft<sup>3</sup>]) will be removed from the UPR-600-22 waste site. The following describes the controls to be implemented during the excavation and load out of contaminated soil:

- Fixative will be applied to the two areas excavated immediately after soil removal activities to ensure soil does not migrate from the area. The windrows will be flattened, ensuring not to cover either of the excavated areas. The entire area will have fixative applied to ensure soil does not migrate from the area. GPERS surveys will be conducted over the entire waste site. If necessary, based on GPERS surveys, any "hot spots" will be remediated, fixative reapplied, and the area resurveyed, or an in-process sample collected for the "hot spot" location to confirm that the contamination is below cleanup levels. Based on the in-process sampling results (if collected), or the decision to continue to remediate, remediation will continue, fixative reapplied, and resurveying continued until the "hot spots" have

been removed. Replacement verification samples will then be taken from each of the two failed locations and submitted for laboratory analysis. If verification sample results show the two sample locations meet the residential soil cleanup levels, closure documents will be prepared. Finally, another application of soil fixative or mulching agent will be applied pending revegetation of the area during the next planting window.

- Water will be applied during excavation and container loading as needed to minimize airborne releases. Only the amount necessary to control airborne releases will be used so as to minimize the potential for downward migration of mobile contaminants.
- Soil fixatives will be applied to any contaminated soils that will be inactive for more than 24 hours.
- Fixatives will be applied to contaminated soils that will be inactive less than 24 hours at the end of work operations, if the sustained wind speed is predicted overnight to be greater than 32.2 km/hr (20 mi/hr) based on the Hanford Meteorological Station morning forecast. This will allow the project enough time, if necessary, to prepare for the application of dust control measures. If a soil fixative has already been applied and the soil will remain undisturbed, further use of fixatives will not be needed. The fixatives or other controls will not be applied when the contaminated soils are frozen, or if it is raining, snowing, or other freezing precipitation is falling at the end of work operations.
- An entry will be made in the project logbook or equivalent when the forecast predicts sustained wind speeds of greater than 32.2 km/hr (20 mi/hr) and dust control is to be applied at the end of the work shift.

#### 4.0 MONITORING

The potential emissions from remediation of the UPR-600-22 waste site are anticipated to be negligible due to the small amount of soil to be removed and the low concentration of radiological contaminants. During excavation of contaminated soil, a minimum of two portable air samplers will be deployed, as close to the work area boundary as practicable, one in the predominant downwind direction and the other between the work area and the Chelan Building at Energy Northwest's Columbia Generating Station. The air samplers that will be used are those that are employed daily by radiological control to assess the airborne radiological conditions present during operations. The resulting air samples will be processed in accordance with Washington Closure Hanford procedures including RC-200, *Radiological Control Field Procedures*, RC-200-4.1, "Field Air Sampling," and RC-100, *Radiological Control Support Procedures* RC-100-4.1, "Monitoring and Evaluating Airborne Radioactive Material." The air sample(s) will be collected and analyzed according to these procedures.

The air samples will be counted as soon as possible but no later than the next working morning. If the sample result is greater than or equal to 0.1 Total DAC (TDAC), the sample will be retained for further counting. If the sample result is less than 0.1 TDAC, the sample no further counting is required. If 72 calendar hours have elapsed since the sample was collected and the sample result is greater than or equal to 0.3 TDAC, the sample will be sent to the Radiological

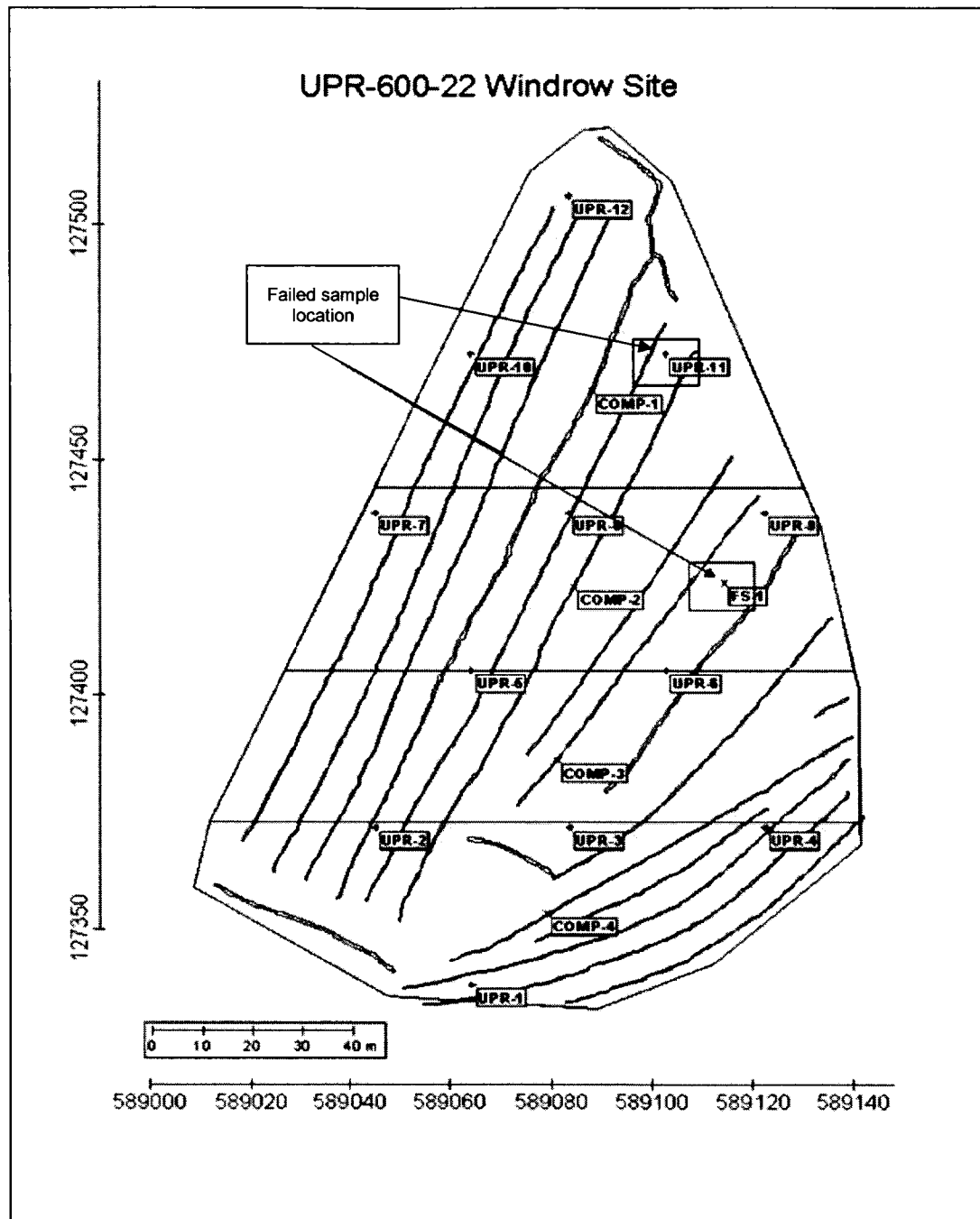
Counting Facility for further analysis. All results are documented on the Air Sample Evaluation Record.

Information on abnormal air sampling results will be provided to the Hanford Site mission support contractor for inclusion in the annual air monitoring report prepared for the Hanford Site. In addition, abnormal air monitoring results will require evaluation of radiological controls and corrective actions to ensure that continued releases do not occur. In the event of abnormal air monitoring results, work will stop and the cause investigated. The results of this investigation will be discussed with the U.S. Environmental Protection Agency before operations continue. Records of routine monitoring and any corrective actions will be provided to regulatory staff upon request.

## 5.0 REFERENCES

- 0600X-CA-V0186, 2015, *Total Effective Dose Equivalent Calculation for the UPR-600-22 Unplanned Release Waste Site*, Rev. 2. Washington Closure Hanford, Richland, Washington
- 0600X-WI-G0069, 2011, *Work Instruction for Verification Sampling of the UPR-600-22, WPPSS Windrow Site*, Rev. 0, Washington Closure Hanford, Richland, Washington.
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 U.S.C. 9601, et seq.
- DOE/RL-2001-47, 2009, *Remedial Design Report/Remedial Action Work Plan for the 300 Area*, Rev. 3, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- EPA, 2013, *Hanford Site 300 Area Record of Decision for 300-FF-2 and 300-FF-5, and Record of Decision Amendment for 300-FF-1*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.
- RC-100, *Radiological Control Support Procedures*, RC-100-4.1, "Monitoring and Reporting Airborne Radioactive Material," Washington Closure Hanford, Richland, Washington.
- RC-200, *Radiological Control Field Procedures*, RC-200-4.1, "Field Air Sampling," Washington Closure Hanford, Richland, Washington.
- WAC 246-247, "Radiation Protection – Air Emissions," *Washington Administrative Code*, as amended.

Figure 1. UPR-600-22 Waste Site Sampling Areas.



**Table 1. Sampling Data from Verification Sampling of the UPR-600-22 Waste Site.**  
(3 Pages)

Sample	Americium-241			Exceeds
	GEA			Residential CUL
	pCi/g	Q	MDA	32 pCi/g
UPR-1	0.197	U	0.2	no
Duplicate of UPR-1	0.11	U	0.11	no
UPR-2	0.17	U	0.17	no
UPR-3	0.083	U	0.08	no
UPR-4	0.11	U	0.11	no
UPR-5	0.191	U	0.19	no
UPR-6	0.145	U	0.15	no
UPR-7	0.266	U	0.27	no
UPR-8	0.117	U	0.12	no
UPR-9	0.208	U	0.21	no
UPR-10	0.102	U	0.1	no
UPR-11	0.15	U	0.15	no
UPR-12	0.13	U	0.13	no
FS-1	7.86		0.32	no
COMP-1	0.104	U	0.1	no
COMP-2	0.203	U	0.2	no
COMP-3	0.077	U	0.08	no
COMP-4	0.126	U	0.13	no
Split of UPR-1	-0	U	0.03	no
Sample	Cesium-137			Exceeds
	GEA			Residential CUL
	pCi/g	Q	MDA	4.4 pCi/g
UPR-1	0.074	U	0.07	no
Duplicate of UPR-1	0.107	U	0.11	no
UPR-2	0.099	U	0.1	no
UPR-3	0.067	U	0.07	no
UPR-4	0.133	U	0.13	no
UPR-5	0.089		0.07	no
UPR-6	0.071	U	0.07	no
UPR-7	0.068	U	0.07	no
UPR-8	0.112	U	0.11	no
UPR-9	0.072	U	0.07	no
UPR-10	0.088	U	0.09	no
UPR-11	0.073	U	0.07	no
UPR-12	0.124	U	0.12	no
FS-1	46.5		0.22	yes
COMP-1	0.107	U	0.11	no
COMP-2	0.165		0.1	no
COMP-3	0.128		0.07	no
COMP-4	0.084		0.07	no
Split of UPR-1	0.003	U	0.03	no

Sample	Cobalt-60			Exceeds
	GEA			Residential CUL
	pCi/g	Q	MDA	1.4 pCi/g
UPR-1	0.071	U	0.071	no
Duplicate of UPR-1	0.089	U	0.089	no
UPR-2	0.084	U	0.084	no
UPR-3	0.07	U	0.07	no
UPR-4	0.096	U	0.096	no
UPR-5	0.07	U	0.07	no
UPR-6	0.066	U	0.066	no
UPR-7	0.067	U	0.067	no
UPR-8	0.079	U	0.079	no
UPR-9	0.065	U	0.065	no
UPR-10	0.083	U	0.083	no
UPR-11	0.082	U	0.082	no
UPR-12	0.119	U	0.119	no
FS-1	0.093	U	0.093	no
COMP-1	0.086	U	0.086	no
COMP-2	0.078	U	0.078	no
COMP-3	0.068	U	0.068	no
COMP-4	0.074	U	0.074	no
Split of UPR-1	0.01	U	0.031	no
Sample	Uranium-235			Exceeds
	GEA			Residential CUL
	pCi/g	Q	MDA	2.7 pCi/g
UPR-1	0.445	U	0.445	no
Duplicate of UPR-1	0.517	U	0.517	no
UPR-2	0.398	U	0.398	no
UPR-3	0.377	U	0.377	no
UPR-4	0.545	U	0.545	no
UPR-5	0.413	U	0.413	no
UPR-6	0.344	U	0.344	no
UPR-7	0.362	U	0.362	no
UPR-8	0.494	U	0.494	no
UPR-9	0.454	U	0.454	no
UPR-10	0.444	U	0.444	no
UPR-11	0.356	U	0.356	no
UPR-12	0.633	U	0.633	no
FS-1	1.07	U	1.07	no
COMP-1	0.448	U	0.448	no
COMP-2	0.439	U	0.439	no
COMP-3	0.37	U	0.37	no
COMP-4	0.312	U	0.312	no
Split of UPR-1				

**Table 1. Sampling Data from Verification Sampling of the UPR-600-22 Waste Site.**  
(3 Pages)

Sample	Uranium-238			Exceeds
	GEA			Residential CUL
	pCi/g	Q	MDA	26.2 pCi/g
UPR-1	7.68	U	7.68	no
Duplicate of UPR-1	12.1	U	12.1	no
UPR-2	9.71	U	9.71	no
UPR-3	7.8	U	7.8	no
UPR-4	11.9	U	11.9	no
UPR-5	8.26	U	8.26	no
UPR-6	9.09	U	9.09	no
UPR-7	7.06	U	7.06	no
UPR-8	12.2	U	12.2	no
UPR-9	8.12	U	8.12	no
UPR-10	9.89	U	9.89	no
UPR-11	8.52	U	8.52	no
UPR-12	13.6	U	13.6	no
FS-1	10.2	U	10.2	no
COMP-1	9.89	U	9.89	no
COMP-2	7.88	U	7.88	no
COMP-3	7.72	U	7.72	no
COMP-4	7.62	U	7.62	no
Split of UPR-1				
Sample	Plutonium-238			Exceeds
	AEA			Residential CUL
	pCi/g	Q	MDA	39 pCi/g
UPR-1	0.042	U	0.32	no
Duplicate of UPR-1	0.113	U	0.22	no
UPR-2	0.052		0.04	no
UPR-3	0.02	U	0.04	no
UPR-4	0.033	U	0.06	no
UPR-5	0.049		0.04	no
UPR-6	0.016	U	0.07	no
UPR-7	0.375		0.06	no
UPR-8	0.02	U	0.06	no
UPR-9	0.015	U	0.06	no
UPR-10	0.049	U	0.07	no
UPR-11	0.03	U	0.1	no
UPR-12	-0	U	0.07	no
FS-1	188		0.07	yes
COMP-1	0.022	U	0.17	no
COMP-2	0.057		0.06	no
COMP-3	0.013	U	0.05	no
COMP-4	0.017	U	0.05	no
Split of UPR-1	0	U	0.07	no

Sample	Plutonium-239/240			Exceeds
	AEA			Residential CUL
	pCi/g	Q	MDA	35 pCi/g
UPR-1	0	U	0.32	no
Duplicate of UPR-1	0.056	U	0.216	no
UPR-2	0.032		0.022	no
UPR-3	0.012	U	0.022	no
UPR-4	0.023	U	0.025	no
UPR-5	0.006	U	0.024	no
UPR-6	-0.004	U	0.043	no
UPR-7	0.007	U	0.036	no
UPR-8	-0.01	U	0.045	no
UPR-9	-0.007	U	0.04	no
UPR-10	0.242		0.031	no
UPR-11	0.01	U	0.056	no
UPR-12	0	U	0.034	no
FS-1	6.77		0.037	no
COMP-1	0.045	U	0.171	no
COMP-2	0.018	U	0.037	no
COMP-3	0.013	U	0.044	no
COMP-4	0.003	U	0.038	no
Split of UPR-1	-0.003	U	0.079	no
Sample	Uranium-233/234			Exceeds
	AEA			Residential CUL
	pCi/g	Q	MDA	27.2 pCi/g
UPR-1	0.678		0.043	no
Duplicate of UPR-1	0.556		0.037	no
UPR-2	0.604		0.243	no
UPR-3	0.634		0.041	no
UPR-4	0.583		0.05	no
UPR-5	0.573		0.041	no
UPR-6	0.649		0.037	no
UPR-7	0.586		0.038	no
UPR-8	0.573		0.042	no
UPR-9	0.639		0.049	no
UPR-10	0.504		0.053	no
UPR-11	0.52		0.048	no
UPR-12	0.494		0.059	no
FS-1	0.533		0.038	no
COMP-1	0.551		0.042	no
COMP-2	0.55		0.034	no
COMP-3	0.489		0.046	no
COMP-4	0.502		0.054	no
Split of UPR-1	0.194		0.106	no

**Table 1. Sampling Data from Verification Sampling of the UPR-600-22 Waste Site.**  
(3 Pages)

Sample	Uranium-235			Exceeds
	AEA			Residential CUL
	pCi/g	Q	MDA	2.7 pCi/g
UPR-1	0.018	U	0.03	no
Duplicate of UPR-1	0.023	U	0.03	no
UPR-2	0	U	0.29	no
UPR-3	0.051		0.03	no
UPR-4	0.024	U	0.04	no
UPR-5	0.032	U	0.04	no
UPR-6	0.041		0.02	no
UPR-7	0.027	U	0.03	no
UPR-8	0.019	U	0.03	no
UPR-9	0.04	U	0.05	no
UPR-10	0.052		0.05	no
UPR-11	0.022	U	0.04	no
UPR-12	0.042	U	0.05	no
FS-1	0.017	U	0.03	no
COMP-1	0.018	U	0.03	no
COMP-2	0.032		0.03	no
COMP-3	0.012	U	0.04	no
COMP-4	0.026	U	0.04	no
Split of UPR-1	-0	U	0.07	no
Sample	Uranium-238			Exceeds
	AEA			Residential CUL
	pCi/g	Q	MDA	26.2 pCi/g
UPR-1	0.573		0.03	no
Duplicate of UPR-1	0.451		0.03	no
UPR-2	0.381		0.24	no
UPR-3	0.595		0.03	no
UPR-4	0.522		0.04	no
UPR-5	0.6		0.04	no
UPR-6	0.651		0.03	no
UPR-7	0.608		0.03	no
UPR-8	0.539		0.03	no
UPR-9	0.569		0.04	no
UPR-10	0.504		0.04	no
UPR-11	0.574		0.04	no
UPR-12	0.506		0.04	no
FS-1	0.436		0.03	no
COMP-1	0.475		0.03	no
COMP-2	0.534		0.02	no
COMP-3	0.463		0.03	no
COMP-4	0.558		0.04	no
Split of UPR-1	0.28		0.06	no

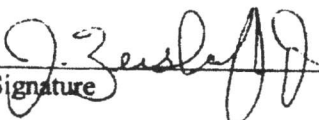
Sample	Technetium-99			Exceeds
	GPC/LSC			Residential CUL
	pCi/g	Q	MDA	1.5 pCi/g
UPR-1	-0.089	U	0.24	no
Duplicate of UPR-1	-0.054	U	0.281	no
UPR-2	-0.144	U	0.281	no
UPR-3	0.041	U	0.235	no
UPR-4	-0.04	U	0.267	no
UPR-5	-0.105	U	0.292	no
UPR-6	-0.1	U	0.299	no
UPR-7	0.065	U	0.303	no
UPR-8	-0.154	U	0.331	no
UPR-9	-0.018	U	0.23	no
UPR-10	-0.13	U	0.325	no
UPR-11	-0.005	U	0.306	no
UPR-12	-0.053	U	0.255	no
FS-1	-0.027	U	0.263	no
COMP-1	-0.026	U	0.258	no
COMP-2	0.007	U	0.283	no
COMP-3	-0.088	U	0.28	no
COMP-4	-0.085	U	0.294	no
Split of UPR-1	0.39	U	0.593	no
Sample	Total beta radiostrontium			Exceeds
	GPC			Residential CUL
	pCi/g	Q	MDA	2.3 pCi/g
UPR-1	-0.034	U	0.214	no
Duplicate of UPR-1	-0.052	U	0.343	no
UPR-2	0.06	U	0.273	no
UPR-3	0.024	U	0.247	no
UPR-4	-0.067	U	0.29	no
UPR-5	0.009	U	0.249	no
UPR-6	0.049	U	0.296	no
UPR-7	0.125	U	0.334	no
UPR-8	0.062	U	0.279	no
UPR-9	0.164	U	0.268	no
UPR-10	0.134	U	0.336	no
UPR-11	7.14		0.229	yes
UPR-12	0.026	U	0.237	no
FS-1	27.2		0.326	yes
COMP-1	-0.1	U	0.247	no
COMP-2	0.05	U	0.504	no
COMP-3	0.057	U	0.235	no
COMP-4	0.022	U	0.244	no
Split of UPR-1	0.071	U	0.176	no

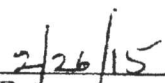


## APPROVAL PAGE


**Title:** Air Monitoring Plan for the Remediation of Unplanned Release Site  
UPR-600-22

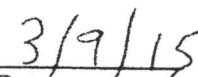
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